

Combined Science
PAPER 1
Foundation tier

Total Marks

Time: 1 hour 10 minutes

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

YOU MUST HAVE

Ruler, calculator

YOU WILL BE GIVEN

Diagram Booklet

INSTRUCTIONS

Answer ALL questions.

Answer the questions in the spaces provided in this Question Paper or in the separate Diagram Booklet – there may be more space than you need.

INFORMATION

The total mark for this paper is 60.

The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

In questions marked with an ASTERISK (*), marks will be awarded for your ability to structure your answer logically, showing how the points that you make are related or follow on from each other where appropriate.

There may be spare copies of some diagrams.

ADVICE

Read each question carefully before you start to answer it.

Try to answer every question.

Check your answers if you have time at the end.

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Some bacteria cause disease.

**(a) Which word describes an organism that causes disease?
(1 mark)**

☐ **A pathogen**

☐ **B culture**

☐ **C antibiotic**

☐ **D platelet**

**(b) Look at the diagram for Question 1(b) in the Diagram Booklet. Draw ONE straight line from each disease to the main way that the disease is spread.
(2 marks)**

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1 continued.

- (c) A scientist investigated the effect of temperature on the growth of bacteria.**

The bacteria were grown at 10 °C and 20 °C.

The number of bacteria grown at each temperature were counted every two hours.

Look at FIGURE 1 for Question 1(c) in the Diagram Booklet. It shows the result.

Look at FIGURE 2 for Question 1(c) in the Diagram Booklet. It shows a graph of the results at 20 °C.

- (i) Plot the points on the graph for the number of bacteria at 10 °C.**

**The first two points have been plotted for you.
(1 mark)**

- (ii) Draw a line of best fit on the graph for 10 °C.
(1 mark)**

(continued on the next page)

1 continued.

- (iii) Describe how the growth of bacteria at 10°C was different from the growth of bacteria at 20°C.
(2 marks)**

(Total for Question 1 = 7 marks)

2 Stone tools can be found at sites used by our human ancestors.

(a) Look at FIGURE 3 and FIGURE 4 for Question 2(a) in the Diagram Booklet. They show two tools found at the same site: tool P and tool Q.

**(i) Describe how tool P was made.
(2 marks)**

(continued on the next page)

2 continued.

- (ii) A scientist stated that tool Q was made by a more evolved human ancestor than tool P.**

**Which observation supports this statement?
(1 mark)**

- ☐ **A tool Q has more colours than tool P**
- ☐ **B tool Q is more pointed than tool P**
- ☐ **C tool Q has fewer colours than tool P**
- ☐ **D tool Q is less pointed than tool P**

(continued on the next page)

2 continued.

(iii) Tools provide evidence for human evolution.

**Use words from the list to complete
the sentences below.**

(2 marks)

enlarge

human

migrate

mutate

natural

negative

**Evolution is the change of inherited
characteristics through**

_____ selection.

These changes occur because genes

_____ .

(continued on the next page)

2 continued.

(b) Fossils were also found in the soil around tool Q.

**Describe TWO ways that stone tools and fossils
can be dated to find out how old they are.
(2 marks)**

1 _____

2 _____

(Total for Question 2 = 7 marks)

3 Alcohol is broken down by liver cells.

(a) Which process moves alcohol from the blood into the liver cells?

(1 mark)

- ☐ **A diffusion**
- ☐ **B respiration**
- ☐ **C osmosis**
- ☐ **D transpiration**

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3 continued.

(b) If a person drinks too much alcohol, liver cells die and the person can develop cirrhosis of the liver.

The relative risk of developing cirrhosis of the liver is affected by two factors.

- 1. The volume of alcohol a person drinks in one week.**
- 2. Whether the person drinks the alcohol on its own or with a meal.**

Look at FIGURE 5 for Question 3(b) in the Diagram Booklet. It shows how these two factors affect the relative risk of people developing cirrhosis of the liver.

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3 continued.

(i) Person A drinks alcohol on its own.

Person B drinks alcohol with their meals.

Calculate the difference in risk for these two people when each one drinks 24 units of alcohol per week.

(3 marks)

(continued on the next page)

3 continued.

- (ii) Using evidence from Figure 5, state TWO pieces of health advice for people about drinking alcohol.
(2 marks)**

1 _____

2 _____

(continued on the next page)

3 continued.

(c) Cystic fibrosis is a genetic condition that can also cause liver disease.

**(i) State where genes are found in cells.
(1 mark)**

(continued on the next page)

3 continued.

- (ii) Look at FIGURE 6 for Question 3(c) in the Diagram Booklet. It shows the inheritance of cystic fibrosis in a family.**

F represents the dominant allele that does not cause cystic fibrosis.

f represents the recessive allele that causes cystic fibrosis.

A scientist states that the genotype of person B is Ff.

**Explain why the scientist is correct.
(2 marks)**

(continued on the next page)

Turn over

3 continued.

**(iii) State the genotype of person C.
(1 mark)**

(Total for Question 3 = 10 marks)

- 4 (a) Look at FIGURE 7 for Question 4(a) in the Diagram Booklet. It shows a height percentile chart for boys.**

The numbers on the right-hand side of the graph show the percentiles of the population for each growth curve.

- (i) A 10-year-old boy has a height of 140 cm.**

**Which is the percentile range for height for this boy?
(1 mark)**

- ☐ **A 10th to 25th**
- ☐ **B 25th to 50th**
- ☐ **C 50th to 75th**
- ☐ **D 75th to 90th**

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4 continued.

**(ii) State how percentile charts are used.
(1 mark)**

(continued on the next page)

4 continued.

(b) As we grow, we make new cells by mitosis and meiosis.

(i) The cells that are made can become specialised.

Look at FIGURE 8 for Question 4(b)(i) in the Diagram Booklet. It shows a diagram of a sperm cell.

**Describe TWO ways that the sperm cell is specialised.
(2 marks)**

1 _____

2 _____

(continued on the next page)

4 continued.

- (ii) Look at the table for Question 4(b)(ii) in the Diagram Booklet. Complete the table to show the results when a cell divides by mitosis or meiosis in humans.**

**Human body cells, except gametes, have
23 pairs of chromosomes.
(4 marks)**

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4 continued.

(c) The tips of plant roots are where many cells are dividing by mitosis.

**(i) Which term describes the area of a root where many cells are dividing by mitosis?
(1 mark)**

☐ **A meristem**

☐ **B root hair cell**

☐ **C xylem**

☐ **D phloem**

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4 continued.

- (ii) Plant root cells contain an enzyme that joins glucose molecules together to make starch.**

Devise a plan to investigate the effect of pH on the activity of this enzyme.

(3 marks)

(continued on the next page)

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4 continued.

(Total for Question 4 = 12 marks)

5 (a) DNA molecules contain base pairs.

**Describe how the base pairs are bonded together
in a DNA molecule.**

(2 marks)

(continued on the next page)

5 continued.

(b) Look at FIGURE 9 for Question 5(b) in the Diagram Booklet. It shows part of a DNA molecule.

(i) Write the code for the complementary DNA strand in Figure 9.

(2 marks)

(ii) Three bases code for each amino acid.

Which is the maximum number of amino acids coded for by this strand of DNA?

(1 mark)

☐ **A 3**

☐ **B 4**

☐ **C 6**

☐ **D 12**

(continued on the next page)

5 continued.

**(iii) What is the shape of a DNA molecule?
(1 mark)**

- ☐ **A triple stranded**
- ☐ **B single stranded**
- ☐ **C single helix**
- ☐ **D double helix**

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5 continued.

(c) A student wanted to extract the DNA from fresh peas.

The student crushed the peas and added washing up liquid and water.

The enzyme protease was then added to this mixture.

(continued on the next page)

5 continued.

- (i) Explain why the enzyme protease was added to the mixture.
(2 marks)**

(continued on the next page)

5 continued.

(ii) The mixture was then heated and filtered.

Finally, the student poured the filtrate into a test tube and ice-cold ethanol was poured down the side of the test tube into the filtrate.

State why ice-cold ethanol was poured into the filtrate.

(1 mark)

(continued on the next page)

5 continued.

(iii) The student wanted to compare the mass of DNA found in fresh peas with the mass of DNA found in fresh beans.

**Give TWO variables the student would need to control to make this a valid comparison.
(2 marks)**

1 _____

2 _____

(Total for Question 5 = 11 marks)

- 6 (a) Look at FIGURE 10 for Question 6(a) in the Diagram Booklet. It shows the number of people diagnosed with sexually transmitted infections (STIs) in the UK during 2017.**
- (i) State the sexually transmitted infection that has the median number of people diagnosed. (1 mark)**
-
-

- (ii) The population of the UK in 2017 was 66 million people.**

Calculate the total number of people diagnosed with chlamydia in the UK in 2017. (2 marks)

_____ people

(continued on the next page)

6 continued.

**(iii) State why chlamydia can be described as a communicable disease.
(1 mark)**

**(iv) Give ONE way the transmission of chlamydia can be prevented.
(1 mark)**

(continued on the next page)

6 continued.

- (v) Explain why chlamydia can be treated with antibiotics.
(2 marks)**

(continued on the next page)

6 continued.

***(b) When a person is infected with a disease, the immune system will respond to protect their body.**

Explain how the immune system will respond to an infection caused by bacteria.

(6 marks)

(continued on the next page)

Turn over

6 continued.

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(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS
END OF PAPER